

US009946297B2

(12) United States Patent

Nazzaro et al.

(54) AUXILIARY ELECTRONIC DEVICE ATTACHABLE TO A WEARABLE ELECTRONIC DEVICE

(71) Applicant: APPLE INC., Cupertino, CA (US)

(72) Inventors: David I. Nazzaro, Saratoga, CA (US); Tyler S. Bushnell, Mountain View, CA (US); Javier Mendez, San Jose, CA

(US)

(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 314 days.

(21) Appl. No.: 14/632,924

(22) Filed: Feb. 26, 2015

(65) Prior Publication Data

US 2016/0091922 A1 Mar. 31, 2016

Related U.S. Application Data

- (60) Provisional application No. 62/057,531, filed on Sep. 30, 2014.
- (51) Int. Cl.

 H01F 27/42 (2006.01)

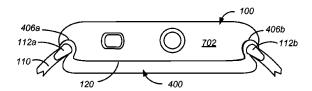
 H01F 37/00 (2006.01)

 H01F 38/00 (2006.01)

 G06F 1/16 (2006.01)

 A61B 5/00 (2006.01)

 (Continued)



(10) Patent No.: US 9,946,297 B2

(45) **Date of Patent:** Apr. 17, 2018

(58) Field of Classification Search

CPC .. A44C 5/14; G04B 37/0008; G04B 37/1433; G04B 37/14; G04G 17/08 USPC 368/281–282; 224/152, 164–180; 307/104

See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

6,749,122 B1 6/2004 Koenck et al. 8,207,906 B2 6/2012 Tiscareno et al. (Continued)

FOREIGN PATENT DOCUMENTS

WO 2012/152980 11/2012

OTHER PUBLICATIONS

PCT/US2015/044571, "International Search Report and Written Opinion", dated Feb. 23, 2016, 17 pages.

(Continued)

Primary Examiner — Carlos Amaya (74) Attorney, Agent, or Firm — McDermott Will & Emery LLP

(57) ABSTRACT

An auxiliary electronic device attachable to a wearable electronic device. The auxiliary device includes a housing, electronic circuitry within the housing, and an attachment mechanism configured to attach the auxiliary electronic device to the wearable device while the device is being worn by a user. In some embodiments the electronic circuitry includes a power transmitting unit that can wirelessly transmit power to charge a rechargeable battery within the wearable electronic device. In some embodiments the attachment mechanism includes a pair of lugs that extend, from opposite ends of the housing, above the housing towards a center of the auxiliary device and are adapted to fit within corresponding recesses of the wearable electronic device.

24 Claims, 7 Drawing Sheets

